



Biodiversity in Urban Settings : the Wipro experience

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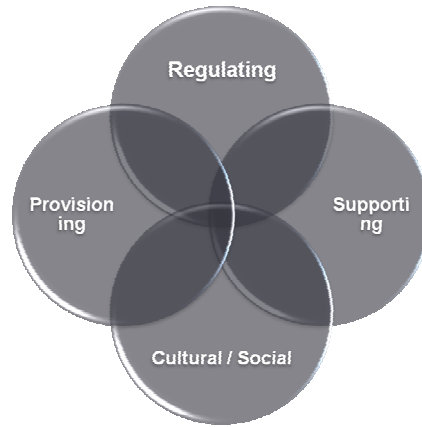
Talking points

Biodiversity and Business

The criticality of urban biodiversity

The Wipro case study

The ecosystem Services of biodiversity



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Business & Biodiversity: the Big Picture

\$ 400Bn of economic value per annum

Table 1: Relationship between biodiversity, ecosystems and ecosystem services

Biodiversity	Ecosystem goods and services (examples)	Economic values (examples)
Ecosystems (variety & extent/area)	<ul style="list-style-type: none"> • Recreation • Water regulation • Carbon storage 	Avoiding GHG emissions by conserving forests: US\$ 3.7 trillion (NPV) ²²
Species (diversity & abundance)	<ul style="list-style-type: none"> • Food, fibre, fuel • Design inspiration • Pollination 	Contribution of insect pollinators to agricultural output: ~US\$ 190 billion/year ²³
Genes (variability & population)	<ul style="list-style-type: none"> • Medicinal discovery • Disease resistance • Adaptive capacity 	25-50% of the US\$ 640 billion pharmaceutical market is derived from genetic resources ²⁴

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Key questions for urban biodiversity

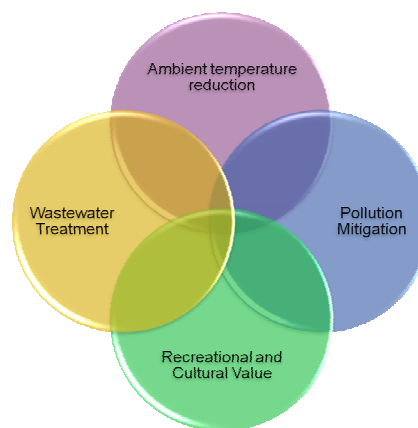
In an urban context, where biodiversity has already been destroyed to a large extent, can restoration work ?

Is biodiversity restoration of much use in cities...given smaller land parcels and pervasive sources of pollution in adjacent areas

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Does biodiversity in small land parcels matter ?



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The case for urban forestry

The effect of trees on temperature and pollution : a Bangalore case study



Urban Micro-climate study in Bangalore*

- Tropical cities experience the most severe effects of urbanization – accelerated heat island effect, changes in microclimate, high pollution levels and thermal discomfort....leading to
- Increased probability of heat strokes, health disorders and altered patterns of precipitation
- Trees can reduce pollution levels significantly by removal of pollutant gases such as SO₂, NO_x, CO and O₃ through leaf stomata, and through the dry deposition of suspended particulate matter on leaf surfaces
- Trees can also reduce heat island effect and microclimate amelioration
- Reduction of ambient temperature leading to reduction in AC demand and fossil fuel consumption

* Effect of street trees on microclimate and air pollution in a tropical city by Lionel Sujay Vailshery, Madhumitha Jagannathan, Harini Nagendra (ATREE),

Urban micro-climate study

- Study done in Bangalore in 2010 ; Population of 9.5 Mn, temp range of 12 to 38 deg C ; annual rainfall of 880 mm

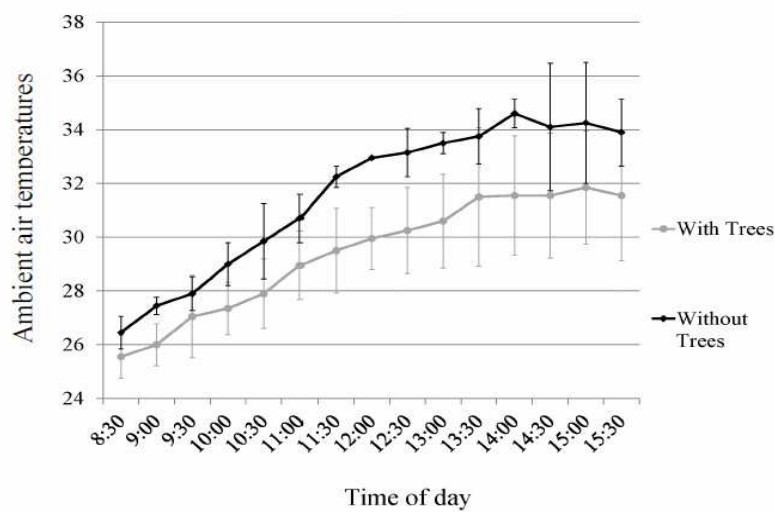
- Sample : Ten major roads in different parts of the city ; roads that had both patches ...trees for at least 150 m and no trees at all ; Sampling done in the summer month of May

- Recordings done every half an hour

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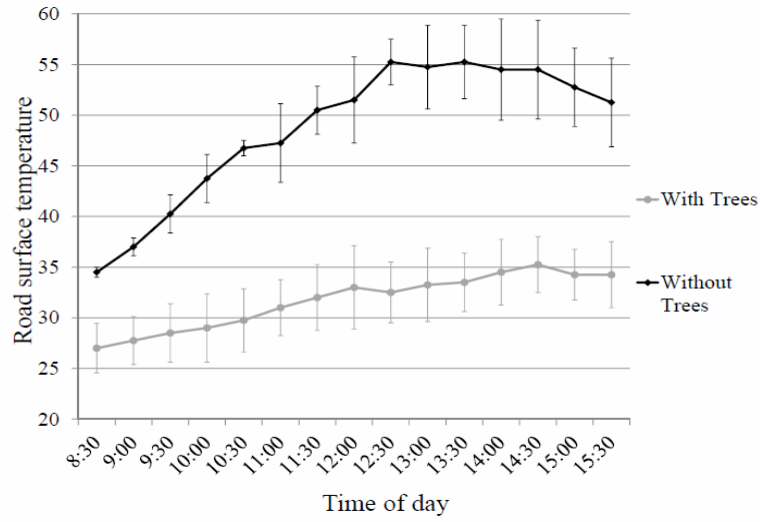
Trees and Ambient air temperature



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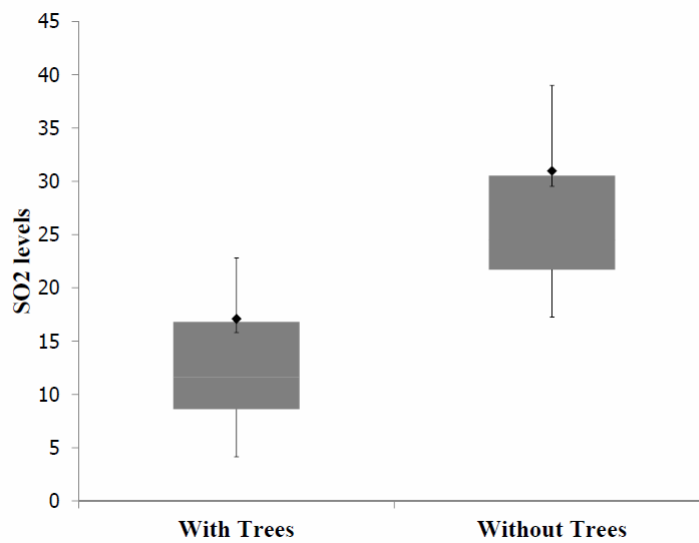
Trees and road surface temperature



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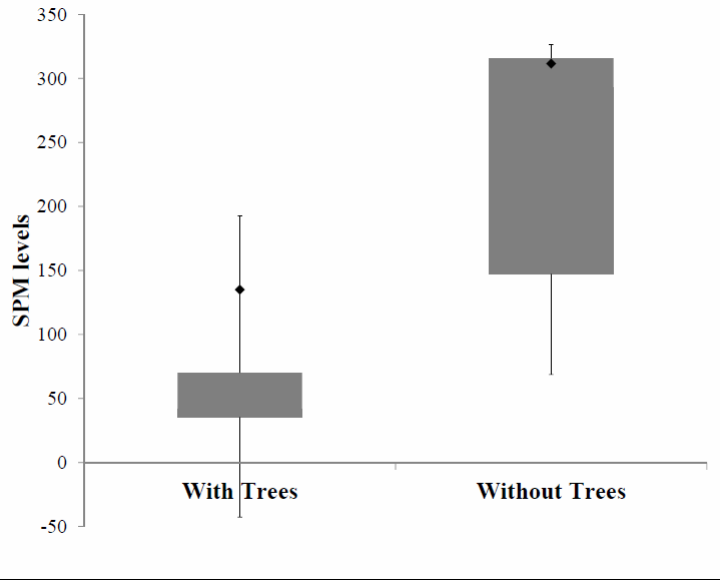
Trees and SO2 levels



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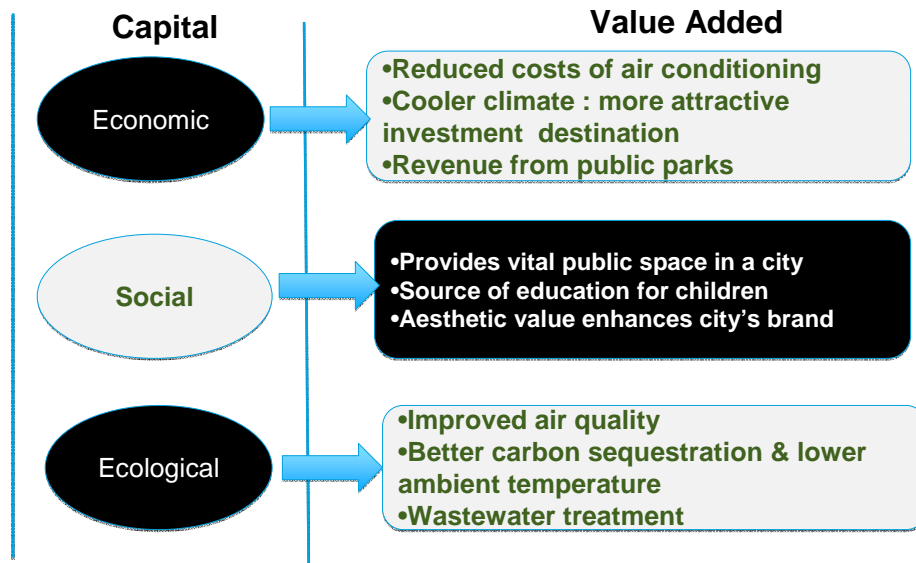
Trees and SPM levels



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Capital and value creation from urban biodiversity



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The Wipro Case Study



16 Sustainability dimensions and 7 stakeholders



Our biodiversity goals

- ▶ **To convert our existing campuses to biodiversity zones**
- ▶ **All new campuses to incorporate biodiversity principles into their design**

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Biodiversity in our campuses

Our definition of campus biodiversity

- ▶ Minimize exotics and lawns
- ▶ Increase and enhance number of species
- ▶ Maximize native species – mix of shrubs, flowering and fruiting species and insect species
- ▶ Shift the definition of aesthetics – from manicured and geometrical to natural and non-linear

Expected collateral outcomes

- ▶ A significant improvement in the air quality around the campus
- ▶ An eventual reduction of 1.5 to 2 deg C in the ambient temperature with a corresponding reduction in cooling load, and GHG emissions
- ▶ Enhanced employee interest, engagement and awareness

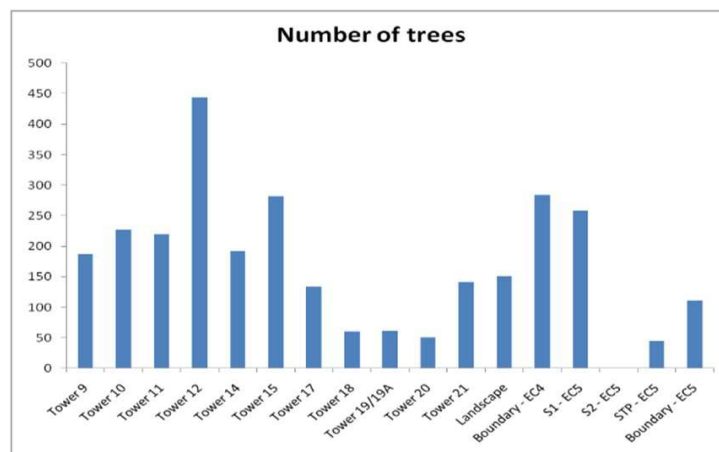
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Our first pilot : the Electronic City campus in Bangalore



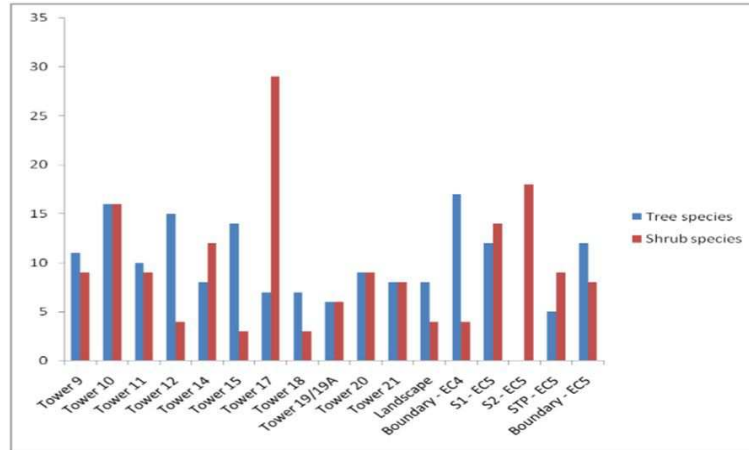
Base-lining 2011 : Tree Census



Total trees - 2849; in EC4 - 2343, in EC5 - 415
 Most trees (444) in areas around Tower 12
 No trees in tower S2



Tree and Shrub/Herb species



36 species of trees; high diversity in EC 4 boundary
60 species of shrubs and herbs; high diversity in tower 17, low diversity in towers 12, 15, 18 and EC4 boundary

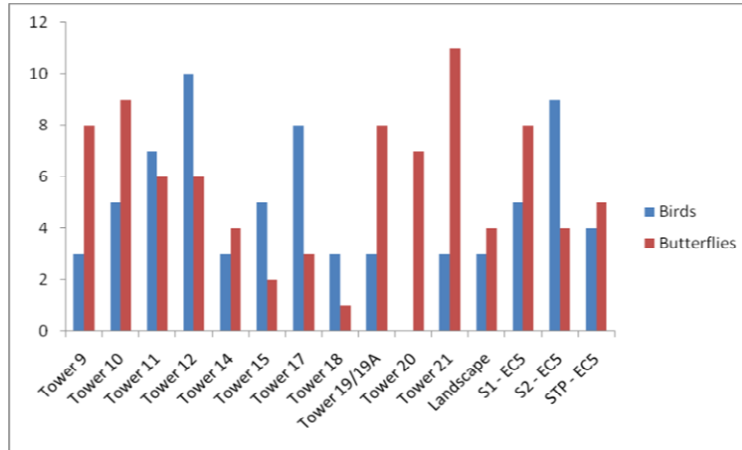


Sampling units for birds, butterflies, other faunal taxa



Birds and butterflies are mobile, cannot be censused - conducted one-time sampling study
 Within each tree/shrub census unit, observations made at 4-6 points distributed to cover different types of vegetation

Bird and Butterfly species



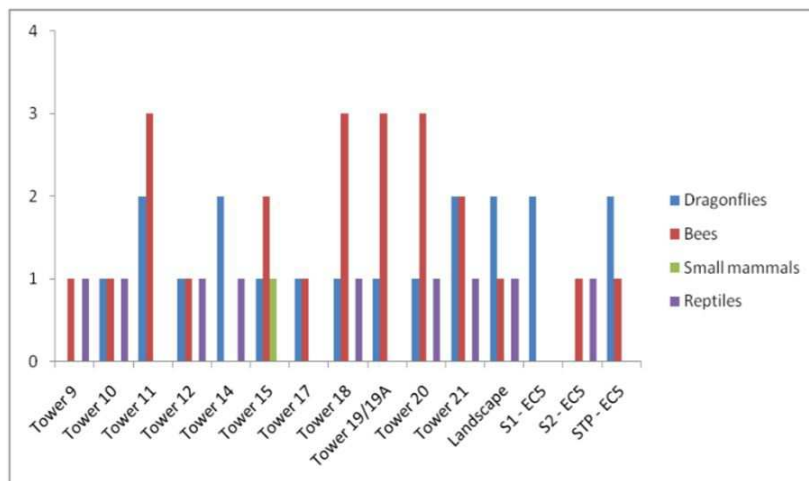
15 bird species and **23 species of butterfly**

Most bird diversity in towers 12 and S2, no birds in tower 20

Greatest butterfly diversity in towers 21 & 10, least diversity in tower 18



Other faunal species



Squirrel eating dragonfly captured from skink after a fight...

Gorgeously colored Golden backed ant



Tiny frog, cryptic coloration

Rare observation - Rhino Beetle – half eaten carcass of male and live female – native to Bannerghatta range, endangered, usually breeds on elephant dung – indicates EC 4/5 are close to elephant route!

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Summary of initial study observations

- Significant scope for planting more trees
- Bird diversity positively related to number of trees
- Most shrubs and herbs are ornamental non-flowering, hybrids which cannot support birds and butterflies
- Limited bird feeding and nesting activity on campus, could be increased by changing plant composition, adding nest boxes, bird feeders and baths

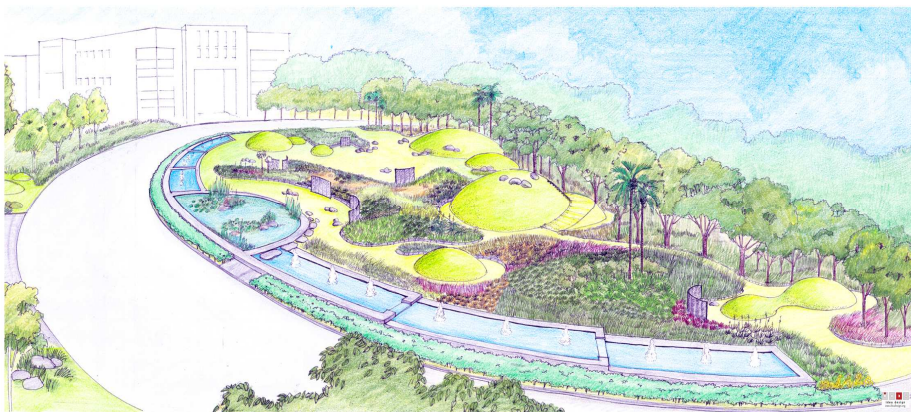
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The blueprint for change



The Deccan theme in the arrival area



The Butterfly park in the central area(s)



Our broad re-plantation strategy

- Increase the number of species by a factor of 2X at the least
- Species to be predominantly native and in alignment with the theme of each sub-area
- Where possible, transplant existing exotics to identified areas within and outside

Some early outcomes

- **May 2013 saw an unprecedented sight..**
- **Hundreds and thousands of migratory butterflies on their semi-annual journey from Western to Eastern Ghats rested in our campus for nearly a month to rest and feed**
- **Sense of wonder and renewed energy among employees**





Biodiversity as a platform for employee engagement

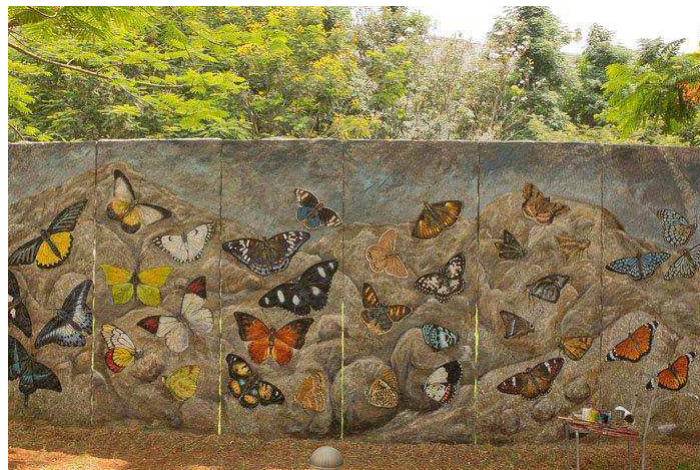
- **Identify employee champions for biodiversitymore than 30 till now from the E-City facility**
- **Conduct 'expert' workshops for the employees covering biodiversity principles, forests and communities, urban ecology**
- **More general town hall gatherings on specific occasions e.g. Earth Day, Wildlife week etc**
- **Employee portal for employees to upload images, share experiences etc**

Signage as art and education



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Signage as art and education




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Employee education material

Arrival Area Deccan Theme






A glimpse of the Deccan landscape

Bangalore is part of the Deccan plateau located between mountains of the Eastern and Western Ghats. It receives about 800 mm of rainfall which allows for a diverse matrix of arid grasslands, tropical dry deciduous forests, seasonal streams, wetlands and human settlements with a boulder-dotted rolling topography. Most of the Deccan landscape has been cultivated and used for several millennia, creating its own unique fauna and flora that coexist with humanity. This region was habitat to the now extinct Asiatic Cheetah. It continues to provide habitat for highly fragmented populations of the Black buck antelope and other mammals, reptiles and birds.

SIGNAGE AS A SERIES OF HAND-PAINTED STONE PANELS

DECCAN FAUNA





eco-eve eco action at Wipro



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Employee education material

Arrival Area Deccan Theme





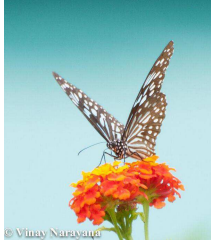
Planting Concept

To mimic the Grassland and Scrubland plant communities of the Deccan Plateau.

Native and drought tolerant species

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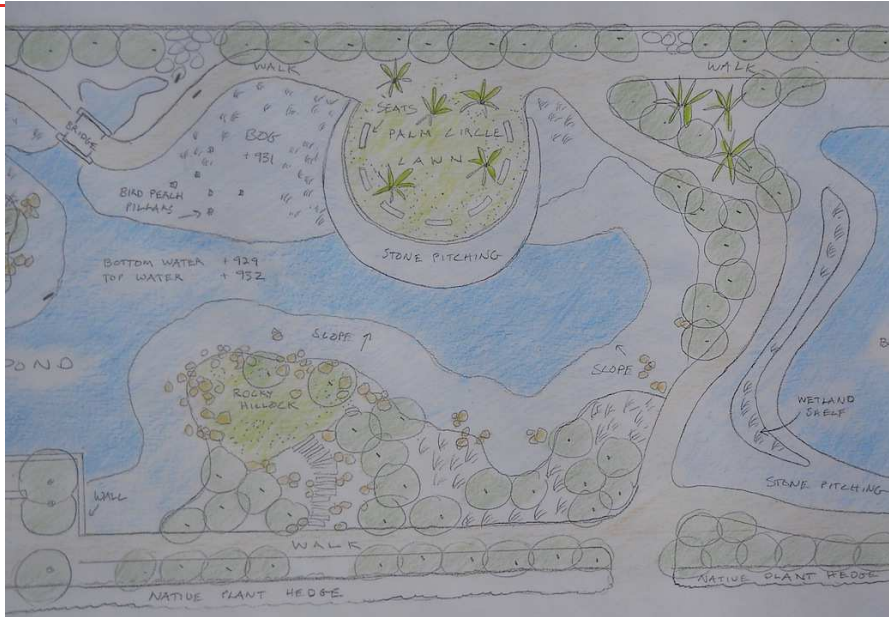
Employees as biodiversity champions



Employee captured images



Phase II : Wetland biodiversity, using treated waste water



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Work in Progress



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Artist's view of completed project



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The power of engaged employees



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Ecosystem services – some examples

Regulating Services

- Improve micro-climate effects : lowered air pollution, lower ambient temperature

Provisioning Services

- Herbal Garden
- Fruit bearing trees

Supporting Services

- Use of treated waste water in wetland

Aesthetic / Cultural Services

- Powerful source of education and enrichment for employees
- Indirect positive psychological effects

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SUMMARY – WIPRO EP&L 2013/14



Environmental impact	Environmental cost (INR million)	%
GHGs	4,883	56%
Water abstraction	1,530	18%
Air pollution	1,370	16%
Water pollution (Ops)	518	6%
Land use	290	3%
Waste	63	0.7%
Total	8,655	100%



Value chain stage	Environmental cost (INR million)	%
Operational	4,380	51%
Supply chain: Purchased goods & services	1,171	14%
Supply chain: Fuel- and energy-related activities	1,423	16%
Supply chain: Business travel	917	11%
Supply chain: Employee commuting	764	9%

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In conclusion

- ***“The real voyage of discovery consists not in seeking new landscapes, but in having new eyes”*** *Marcel Proust*
- Biodiversity offers a new template for business ; a template that teaches you
 - to see the unseen
 - To unhide the hidden
 - To look at the notion of value beyond numbers and business case
 - That certain things once lost cannot be restored



Thank you